

**PS-232**

**2-CHANNEL POWER SUPPLY**

**I N S T R U C T I O N   M A N U A L**

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Part Number 810277 Rev. A

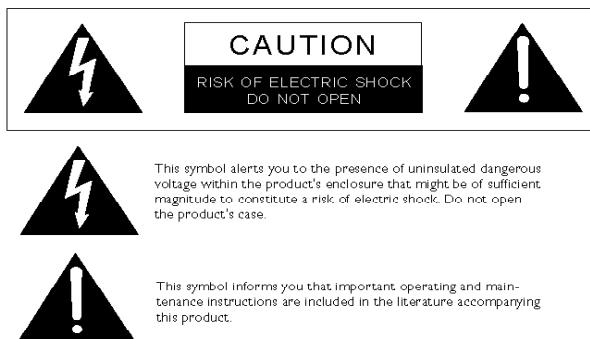
Clear-Com Intercom Systems  
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U.S.A

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## IMPORTANT SAFETY INSTRUCTIONS

- 1 Read these instructions.
- 2 Keep these instructions.
- 3 Heed all warnings.
- 4 Follow all instructions.
- 5 Do not use this apparatus near water.
- 6 Clean only with dry cloth.
- 7 Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- 8 Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9 Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10 Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11 Only use attachments/accessories specified by the manufacturer.
- 12 Unplug this apparatus during lightning storms or when unused for long periods of time.
- 13 Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as if the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 14 Do not expose the apparatus to dripping or splashing and do not place objects filled with liquids, such as vases, on the apparatus.

**WARNING:** To reduce the risk of electric shock, do not expose this apparatus to rain or moisture .



## QUICK START

- 1 Unpack the unit and inspect for any damage that may have occurred in shipping. Connect the proper AC Mains cable to the outlet on the rear panel.
- 2 Install the PS-232.
- 3 Connect the intercom lines and Program Input as required. Connect the AC cord to the Mains circuit.
- 4 Set the two termination switches on the rear panel to **ON**.
- 5 Switch the Power **ON**. The green power light should be **ON** and the two red overload lights should be **OFF**.
- 6 Switch the Test Tone and A+B Link switches **OFF**. The yellow A+B Link light should be off.
- 7 Select program sends and set program levels as required using Program Trim and Program Send Level controls.
- 8 Set levels and sidetone nulls at remote stations.
- 9 The intercom system should now be operating properly.
- 10 Read the rest of this manual for further information.

## OPERATION

Congratulations on choosing this Clear-Com product.

The PS-232 Power Supply is a powerful, yet user friendly unit that can serve as the heart of a Clear-Com system.

We recommend that you read through this manual completely to better understand the functions of the PS-232 and how to optimize your system setup. Please pay particular attention to the section on system wiring, as improper wiring detracts from the performance of the system or causes system failure. If you encounter a situation or have a question that this manual does not address, contact your dealer or call Clear-Com direct at the factory. Our applications support and service people are ready to help.

### Description

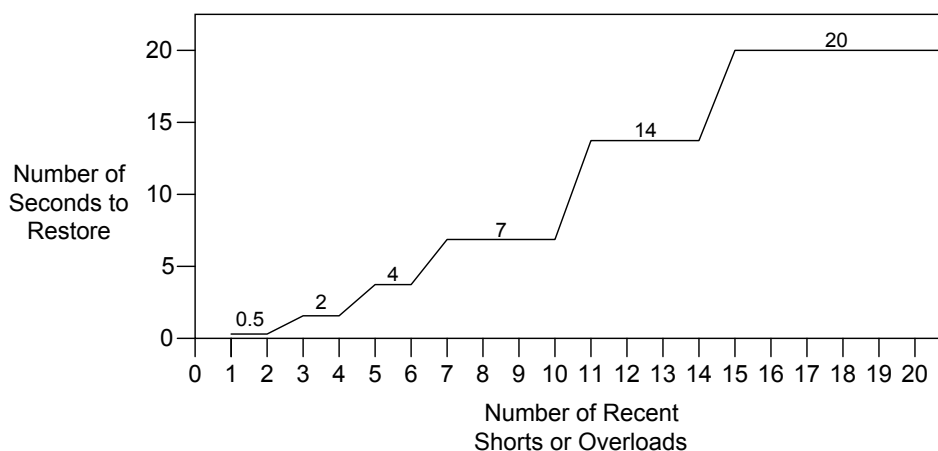
The Clear-Com PS-232 is a single rack space, one- or two-channel intercom power supply which can provide 1 amp (2 amps peak during call signals and other temporary events) at 30 Volts DC to operate Clear-Com belt packs and remote stations. This power is supplied to either or both channels, and will support up to 40 headset stations or 15 speaker stations. Clear-Com's advanced fail-safe design can sense the difference between a short or an overload to optimally protect itself. Power is restored in as quickly as 1/2 second, depending upon whether there was a single or multiple short or overload. The other channel continues to operate normally. The PS-232's advanced fail-safe circuit will bring the power back up even under full load conditions. LED indicators signal a fault on either channel. A line-level program input offers a master input level. Individual program selects, each with its own send level, are provided for each channel. Use of a switching power supply allows the PS-232 to operate with any AC line voltage from 90 to 240 Volts AC at 50 or 60 Hz. The unitized aluminum chassis and extra-thick front panel with integral rack ears result in reduced size and a lighter weight package that maintains legendary Clear-Com ruggedness.

### Advanced Fail Safe Power Scheme

As the heart of an intercom system, the power supply has special needs which are not met by traditional designs. It must work in adverse conditions such as low AC line voltage, momentary or continuous

shorts on the DC power lines to the stations, and excessive peak loads during power-on and sometimes during use. The mission of an intercom power supply is torn between giving its all to provide power in the face of these adverse conditions and protecting itself from them. This mission finds an intelligent balance in the PS-232. The following features are incorporated into the PS-232 power supply to make it quickly react to shorts and overloads yet provide a long, reliable product life:

- ◆ **AUTOMATIC SHORT CIRCUIT PROTECTION:** The microprocessor in the PS-232 checks each channel for a short or current overload 100 times per second. If a short lasting longer than 700 mS is detected, the microprocessor will shut down that channel. An short lasting less than 700 mS will not cause the PS-232 to interrupt power. However, during this 700 mS, the output current will be limited to 2 amperes.
- ◆ **AUTOMATIC OVERLOAD PROTECTION:** The PS-232 senses the difference between shorts and overloads. If an overload lasting longer than 2.5 seconds is detected, the microprocessor will shut down that channel. An overload lasting less than 2.5 seconds will not cause the PS-232 to interrupt power. During this 2.5 seconds, the output voltage will be reduced to limit the current to 2 amperes.
- ◆ **AUTOMATIC POWER RESTORE:** The PS-232 microprocessor senses the difference between short-term and long-term shorts and overload conditions. After the first few times a short or overload occurs the PS-232 will try to restore power after only 0.5 seconds. If the short or overload persists or repeatedly happens, the microprocessor will take progressively longer (to a maximum of 20 seconds) to try to restore power. This protects the PS-232 from damage due to overheating. Once the short is removed, the channel will recover, even under a full load condition. The automatic power restore times are shown in the following chart:



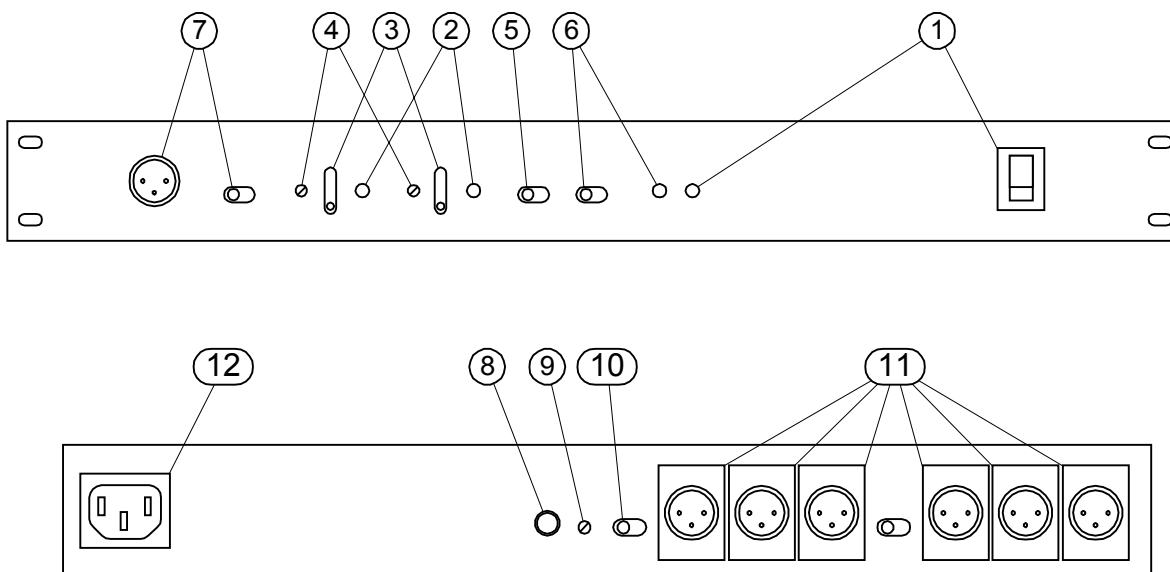
- ◆ **INDIVIDUAL CHANNEL SHORT CIRCUIT PROTECTION:** Each individual channel is separately overload and short circuit protected and may draw as much as 2 Amps, though the total to both channels is limited to 2.25 Amps. A short on any one intercom line will not bring the whole system down.<sup>1</sup>
- ◆ **FRONT PANEL INDICATIONS:** There are two Overload indicators on the front panel (one for each channel) and a Power indicator for the power supply. The Overload indicators light steady when an overload or short condition is detected. They blink if power to a channel has been shut off as a result of an overload or short. There is also an indicator to show when channels A and B are linked.
- ◆ **PARALLELING MULTIPLE POWER SUPPLIES:** Multiple power supplies can be paralleled to increase system capacity. The PS-232 microprocessor will automatically detect the actions of other power supplies during overloads and shorts circuits to restore power as quickly as possible.

<sup>1</sup> Power supply lines connected together at remote stations will disable the individual channel short circuit protection feature.

- ◆ **MULTI-CHANNEL REMOTE STATIONS MAINTAIN THE POWER LINE ISOLATION:** The RM-220, KB-211, and MR-202 as well as any two-channel remote stations or beltacks are designed to use the isolated power provided by the PS-232. Refer to the **INSTALLATION** section.
- ◆ **LOW NOISE CIRCUITRY:** The direct current outputs of the PS-232 contain very little hum and noise. The PS-232 does not contribute to audible noise in the remote stations and beltacks.

### FRONT AND REAR PANELS

A description of the connectors and controls follows. Refer to Figure 1.



**Figure 1**

#### Front Panel

- 1 **POWER SWITCH:** Turns the AC power to the PS-232 on and off. The green Power light will illuminate when the power is ON.
- 2 **OVERLOAD INDICATORS:** If a short circuit or overload condition appears on either of the intercom channel outputs, the red Overload light for that channel will illuminate. If this condition persists, the microprocessor will disconnect power to that channel and the red Overload light will blink. If a red Overload light is blinking, the fault on that channel must be located and removed. When the fault is removed, the PS-232 will restore power to that channel and the Overload light will go out. If there are no shorts, but the Overload light blinks, an overload exists, possibly due to too many intercom stations connected on that intercom line.  
  
If the failure continues, unplug the intercom line connected to the affected channel. Its red Overload light should go out. This indicates a short in that line. Follow that intercom line connecting and disconnecting cables along the line until the fault is isolated.
- 3 **PROGRAM SEND ON/OFF:** These toggle switches, one for each channel, connect program audio to each channel. Both channels receive the same signal from the rear panel PROGRAM INPUT. The number of active sends will not affect the overall send level to any channel.
- 4 **PROGRAM SEND LEVEL:** These controls (one for each channel) adjust the level of program heard in that channel. The PROGRAM switch must be ON for the control to function on that channel. (The level controls work in conjunction with the PROGRAM TRIM (8) level control on the rear panel.) For a higher program level, turn the control clockwise. For less program level turn the control counter-clockwise. If the control is all the way up on a channel and the program

level in the line is not loud enough, increase the input level with the PROGRAM TRIM control on the rear panel. Conversely, if there is still program heard on a channel when the its level is all the way down, decrease the PROGRAM TRIM level. Any change in the PROGRAM TRIM level control on the rear panel to adjust for one channel will necessitate adjustments on the other channel to compensate.

**NOTE: Do not force the controls past their stop points as this will damage them.**

- 5 TEST TONE: This toggle switch turns on a 440 Hz test tone which can be heard on either or both channels when the PROGRAM SEND switch for that channel is in the OFF position. It can be handy for identifying which intercom channel is which or for other test purposes. The PROGRAM SEND LEVEL controls adjust the level of the test tone on each channel.
- 6 A+B LINK SWITCH and INDICATOR: This toggle switch links the audio for channels A and B together. A yellow light indicates when the channels are linked. It can be useful to have both channels linked for rehearsals, but separated for performances.
- 7 INTERCOM LINE CONNECTOR and SWITCH: A single intercom line connector is located on the front panel for convenience. It can be switched between channels A and B with the associated toggle switch.

### **Rear Panel**

- 8 PROGRAM INPUT: This 1/4 inch TRS jack accepts a balanced or unbalanced line-level signal. This is typically a feed from a mixing console, an air feed from a studio to remote site over a phone line, or an audio cue track. The input accepts levels up to +10 dBV. Send levels to the individual channels are controlled with a combination of the PROGRAM TRIM level and the PROGRAM SEND levels on the channels. This feed can be fed to either or both intercom lines.
- 9 PROGRAM TRIM: This control adjusts the overall input level of the external program coming into the PS-232. It is used with the PROGRAM SEND LEVEL controls to achieve desired system program levels. Turn the control clockwise to increase the gain and counter-clockwise to reduce it.

**NOTE: Do not force this control past its stop points as this will damage it.**

- 10 TERM. ON/OFF: These switches (one per channel) select whether the PS-232 will provide the required 200 Ohm termination for each channel. These should *always* be on unless there are other power supplies or terminated main stations in the system. If there are other possible terminations in the system, all but one must be turned off.
- 11 INTERCOM LINE CONNECTORS: There are three 3-Pin male XLR jacks per channel, wired in parallel, or looped through. All the stations in the system are ultimately connected to the PS-232 through these jacks. Because intercom audio is bidirectional, they are neither inputs nor outputs, but may be thought of as "ports." Pin 1 is connected to the shield and carries the signal ground. Pin 2 carries the DC voltage that runs the remote stations. Pin 3 carries two way audio and call signals.
- 12 AC POWER SUPPLY INPUT: Connects to AC with an IEC cable. The PS-232 will accept any line voltage between 90 and 240 Volts AC @ 50-60 Hz. It will automatically adjust to the line voltage. There is no need for a selector switch or an external fuse.

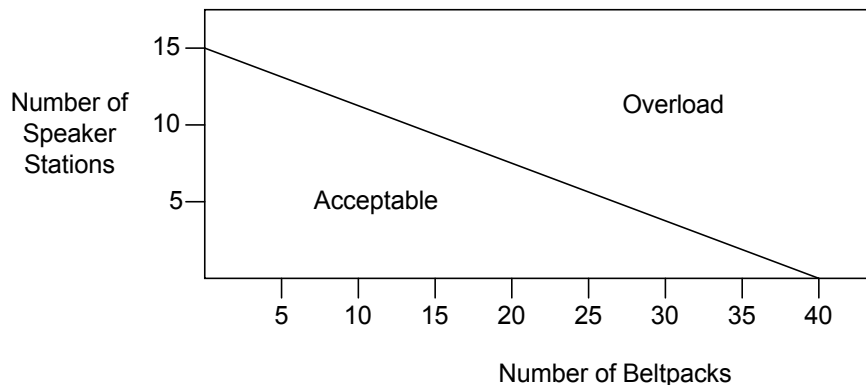
### **Power Distribution and Short Circuit Protection**

The PS-232 is capable of delivering up to 2 amps peak of 30 Volt DC current to Clear-Com stations. The 2 amps peak is available on channel A and 2 amps is available on channel B. Since the total capacity of the PS-232 is 2 amps peak, the combined current of both of the channels at once may not exceed this maximum. Short circuits and overloads on any channel will not damage the PS-232. It will simply cut power off to either or both channels which exceed their maximum current or which cause the

system maximum to be exceeded. A channels which is within its maximum current rating will not be affected by the other channel being automatically cutoff.

Depending upon how many shorts or overloads a channel has experienced recently, the PS-232 will attempt to turn power on again within 500 mS to 20 seconds of automatically cutting off power to an overloaded channel. This allows momentary short or overload conditions to clear automatically. If the PS-232 cuts power off to one or both channels, it will indicate which channel is affected by blinking the red overload LEDs corresponding to these channel(s). This indication will assist in locating the shorted or overloaded channel. Shorts are generally caused by miswiring or damaged cables. Overloads are generally caused by connecting too many beltacks and stations to a channel.

The current requirements of Clear-Com remote stations and beltacks vary with model and use. A station that is simply "on" and idling in the circuit may draw only a small amount of current. The PS-232



will power up to 50 Beltacks, 15 Speaker Stations, or a mix of the two. Refer to the following chart to determine how many of each can be powered in varying combinations. Contact your dealer or Clear-Com if you require further assistance in determining the overall current requirements of your system.

## INSTALLATION

### Intercom Line Connection

The PS-232 provides three rear panel 3-pin male XLR connectors for each intercom line. These connectors are wired in parallel and intended for loop-through connection. Any single-channel station or channel of a multi-channel station connected on a line plugged into Channel A of the PS-232 will be "party-lined" with all the other stations on that same channel. In a multi-channel system, the goal is to assign specific people to the correct group, i.e. the other people whom they need to be in contact with the most. This is particularly important when the party line users are on a single-channel beltack or station; less so if they are on multi-channel stations. The pinout of the intercom connectors is as follows:

- Pin 1 --- Ground (Shield)
- Pin 2 --- Power (+30 VDC)
- Pin 3 --- Audio

### Line Termination (Rear Panel)

Switching of the channels' terminations ON and OFF are done with the rear-panel toggle switches. In most systems, all terminations on the PS-232 should be in the ON position (default setting). The fundamental concept of Clear-Com Party-Line intercom is that all channels are terminated in one location, preferably at the power supply.



**CAUTION: All intercom lines must be terminated. Care must be taken not to "double-terminate" a line. All unused intercom lines must also be terminated.**

The PS-232 provides terminations for each of its two channels. Clear-Com main stations and power supplies provide switch-selectable termination networks on all intercom lines. It is up to the user to insure that the terminations are set correctly. An unterminated line will cause excessive levels, possible oscillation of line drivers, and severe unbalance of hybrid null networks. A line with double or multiple terminations will cause low levels and severe unbalance of hybrid null circuits.

If the PS-232 is the only power supply in the system (no other power supplies or powered main stations are in the system) the termination switch on each channel of the PS-232 should be switched to ON. Simply toggle the rear-panel switch labeled TERM to the ON position. The termination switch should be set to the OFF position **only** if the channel is terminated at another station.

### **Program Input (Rear Panel)**

A TRS connector provides the main program input to the station. This input level is controlled by the rear panel PROGRAM TRIM control adjacent to the PROGRAM INPUT connector. This control sets the overall level for all the channels. The input accepts a balanced or unbalanced line-level audio signal from -20 dBv to +10 dBv. The program can be fed to either or both of the intercom lines by using the front panel toggle switches labeled PROGRAM ON/OFF. There is one of these switches for each channel.

The pinout of the Program Input Connector is as follows:

Shield --- Ground (Shield)

Tip --- + Signal

Ring --- - Signal

### **Rack Mounting**

The unit requires 1.75 inches (44 mm) (1RU) of rack space. It requires no additional free rack space above or below it for ventilation. The station is 5.25 inches (133 mm) in depth and requires at least 2 1/2 inches clearance in the rear for connectors and cables. The single-piece front panel has integral "rack ears". This adds stability and strength. Take care not to over tighten the rack mounting screws as this can mar the front panel.

## System Checkout

### **Before you turn on the power:**

#### ***Check Termination***

There should be one and only one termination for each channel in the system. This termination is usually set to ON at the main station or power supply. To ascertain that only one termination is present on the channel, perform the following test:

- 1 Using a multimeter, measure the resistance between pins 1 and 3 on one of the Channel A XLR connectors at the rear of the unit.
- 2 If the channel is terminated properly, then the resistance should measure approximately 4,000 Ohms. A very high channel resistance means the channel is not terminated. Channel resistance of 2,000 Ohms indicates a double-termination. If a double-termination is indicated, Locate the other power supply or mainstation and set its termination to OFF.

**NOTE: The location of the termination switch varies with model. On some products, the termination switches are on the rear panel; on others they are inside the unit. Consult the unit's manual for the location.**

- 1 Repeat for the other channels.
- 2 Check resistance between Chassis Ground and pin 1. Using an Ohmmeter, measure the resistance from pin 1 on the main station or power supply to chassis ground. The measurement should read 10 Ohms. A high reading (over 100 Ohms) indicates that the 10 Ohm resistor in the unit has failed and requires replacement. Failure to perform the replacement will result in an audible "buzz" in the system. A reading of less than 10 Ohms (or a short) typically indicates that the shell and pin 1 of one of the interconnect cables are shorted together. Test the individual cables until the culprit is located and repair or replace the cable.

**NOTE: PIN 1 and the shell of the XLR plug on the interconnect cables should NOT be connected together.**

#### ***Check Intercom Cable Resistance***

For minimal crosstalk, the ground resistance of the intercom cables should be as low as possible, preferably less than 2 Ohms. Disconnect an intercom line from the main station or power supply. At the point in the intercom line furthest from the unit, connect a clip lead jumper between pins 1 and 2. Back at the "powered" end, use an Ohmmeter to measure the resistance between pins 1 and 2. A value of less than 4 Ohms is ideal.

## Final Tests

### **After you turn the power ON:**

- 1 Check for proper voltage on pin 2 of any intercom line or jack in a channel. It should read 26-30 Volts.
- 2 Test for proper operation of Call Signaling. Activate the CALL SIGNAL on any belt pack or station. The call lights on all other stations on that channel should illuminate and then go out when the call button is released.
- 3 Adjust the sidetone null on all stations. (Refer to the manual for each specific unit for instructions.)

## MAINTENANCE

### Troubleshooting Tips

**Problem:**            **System does not operate. No power to the PS-232. Green POWER light is not illuminated and no OVERLOAD lights are illuminated**

Cause 1:            No AC power to the PS-232.

Solution 1:        Check AC connection and cable. Plug into dependable AC source.

Cause 2:            PS-232 has an internal power supply failure.

Solution 2:        Unit requires servicing.

**Problem:**            **Red Overload Light illuminated**

Cause 1:            Short or overload on that channel due to a shorted or miswired cable.

Solution 1:        Remove cables, one at a time from system until the faulty line is located. Check for shorts between pins 1 and 2. Once the short is removed, the PS-232 will reset automatically and the power will come back up within several seconds, depending upon how long the short has been present.

Cause 2:            Defective remote station.

Solution 2:        Check remote station and replace if necessary.

**Problem:**            **Both red Overload Lights are illuminated**

Cause 1:            System is overloaded.

Solution 1:        Remove cables, one at a time from system to help determine where the excess current requirements lie. Re-evaluate system current needs.

Cause 2:            Short in multipair cable.

Solution 2:        Remove cables, one at a time from system until the faulty line is located. Check for shorts between pins 1 and 2.

**Problem:**            **Hum or buzz in system**

Cause 1:            Inductive pickup caused by close proximity of main or remote stations to power lines or transformers.

Solution 1:        Relocate offending unit.

Cause 2:            10 Ohm chassis ground resistor is open.

Solution 2:        Check the DC resistance for 10 Ohms between the chassis and Pin 1 of any intercom connector.

**If this condition happens, it is because the system ground came into contact with something that was "HOT" with respect to the power supply earth ground. If this occurs, carefully check the system ground and AC distribution in the area.**

**WARNING: This is a potentially dangerous situation. A shock hazard may exist between the metal boom of a remote station headset and ground.**

**Problem:**            **System feedback (Acoustical)**

Cause 1:            Volume control at the remote station is set too high.

Solution 1:        Adjust.

Cause 2:            Channel unterminated.

Solution 2:        Set the PS-232 termination switch for that channel to the ON position.

Cause 3:            A headset extension cord was used.

Solution 3:        Headset extension cords are not recommended.

**Problem:**            **440 Hz tone is present on either or both channels**

Cause 1:            Test tone feature is on.

Solution 1:        Set the test tone switch to the OFF position.

**Problem:**            **Excessive crosstalk**

## Clear-Com PS-232 Power Supply

Cause 1: High DC resistance in ground return.  
Solution 1: Use heavier cable; add additional conductor(s) to ground return.

Cause 2: MULTI-CHANNEL cable pairs are not individually shielded.  
Solution 2: Replace cable with individually shield pairs.

Cause 3: Headset cables are not wired properly or shielded properly.  
Solution 3: Correct wiring. Use headsets with properly shielded wiring.

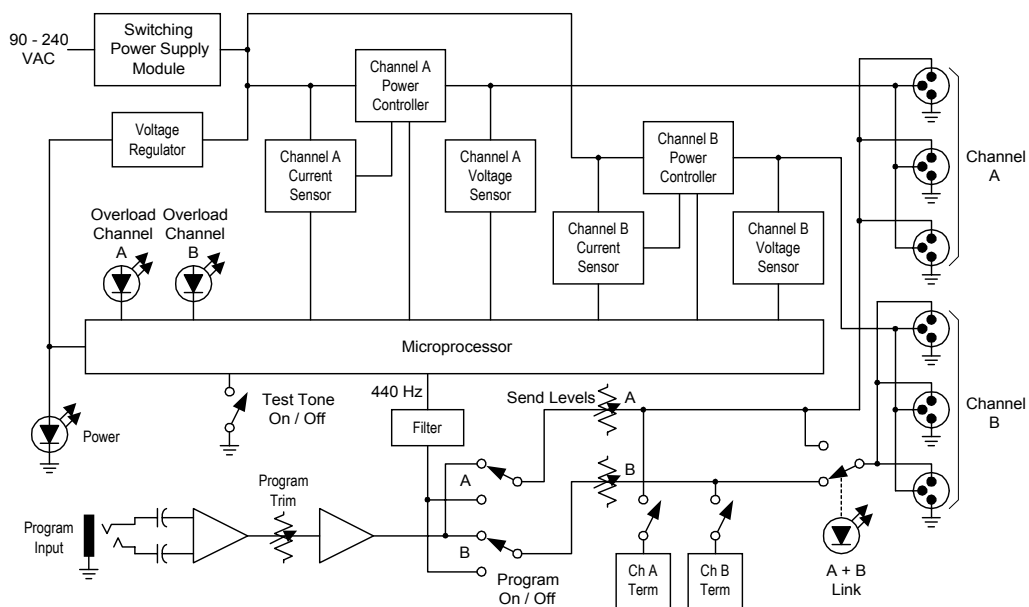
**Problem:** Program signal sounds distorted.

Cause: Overload of PROGRAM IN circuit.

Solution: Reduce PROGRAM IN level or reduce the gain of the program signal at the source, such as an audio mixer.

### PS-232 Block Diagram

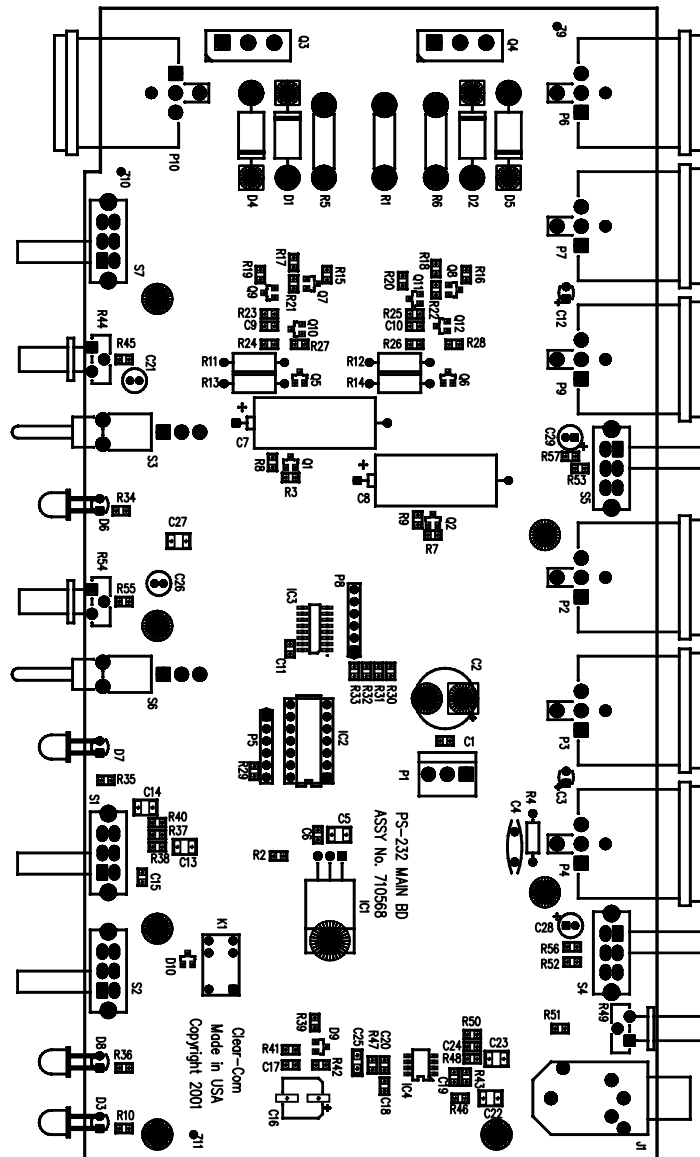
The following is a block diagram of the PS-232:

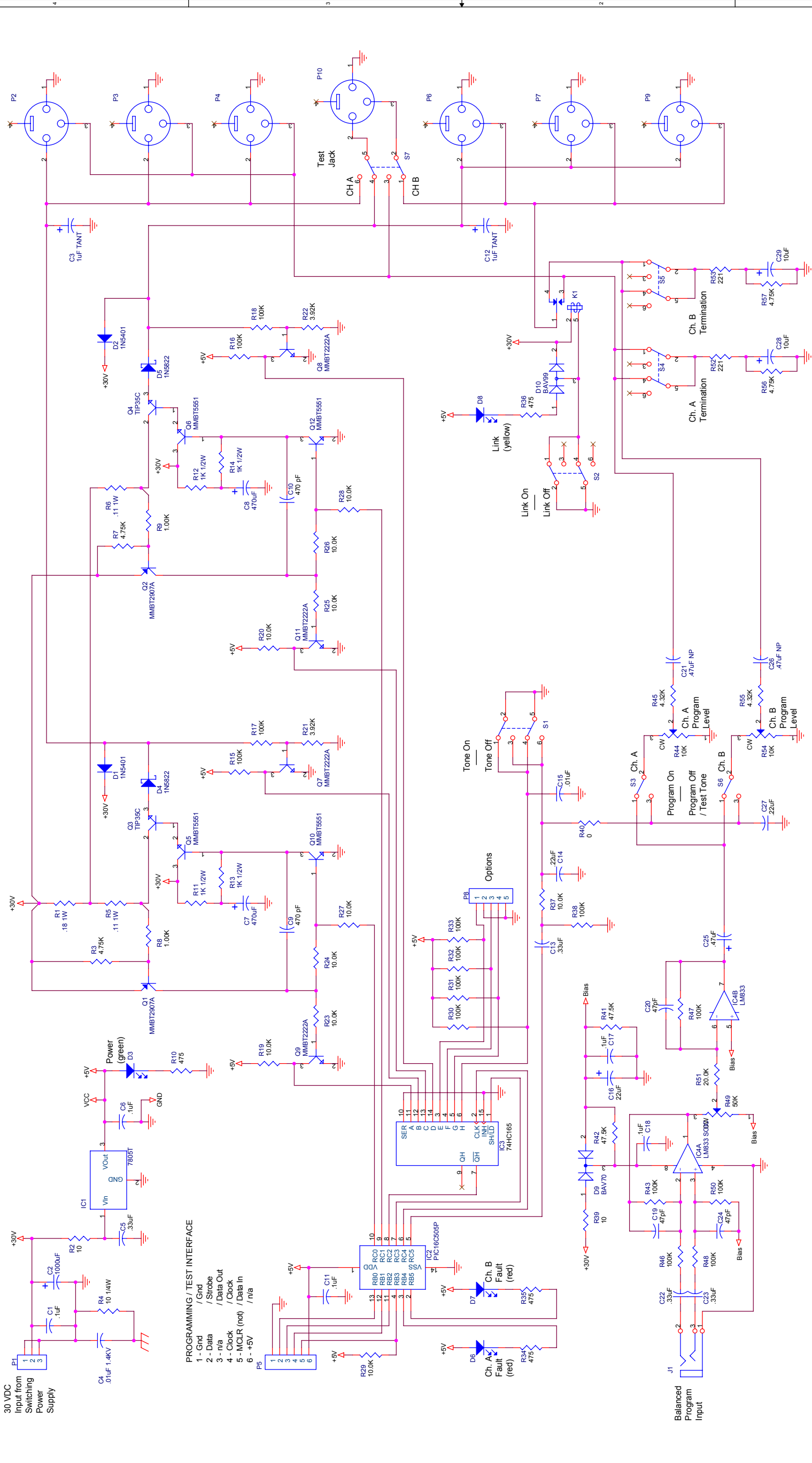


## Parts List

<u>Part</u>	<u>Description</u>	<u>Rating</u>	<u>Part #</u>	<u>Designator</u>
.01	uF Ceramic Disc	1.4KV 20%	150029	C4
.1	uF Monolithic	50V 10%	150035	C1 C6
10	uF Aluminum	50V	150064	C28 C29
470	uF Aluminum	25V	150089	C7 C8
1000	uF Aluminum	35V	150092	C2
1	uF Tantalum	35V 20%	150116	C12 C3
.47	uF Aluminum NP	50V	150151	C21 C26
47	pF Ceramic Disc SMD	50V 5%	151120	C19 C20 C24
470	pF Ceramic Disc SMD	50V 5%	151132	C10 C9
.01	uF Ceramic Disc SMD	50V 10%	151160	C15
.1	uF Ceramic Disc SMD	50V 10%	151172	C11 C17 C18
.22	uF Ceramic Disc SMD	50V 10%	151176	C14
.33	uF Ceramic Disc SMD	25V 10%	151178	C5 C13 C22 C23
.47	uF Tantalum SMD	35V 10%	151184	C25
22	uF Aluminum SMD	50V 20%	151200	C16
LED	GREEN, ROUND LED		390051	D3
LED	RED, ROUND LED		480064	D7 D6
LED	YELLOW, ROUND LED		480065	D8
10	OHM 1/4W Carbon Film	5%	410002	R4
1K	OHM 1/2W Carbon Film	5%	410121	R11 R12 R13 R14
.18	OHM 1W Carbon Comp	5%	410200	R1
.11	OHM 1W Carbon Comp	5%	410201	R6 R5
0	OHM 1/10	SMD 1%	411100	R40
10.0	OHM 1/10	SMD 1%	411197	R39 R2
221	OHM 1/10	SMD 1%	411326	R52 R53
475	OHM 1/10	SMD 1%	411358	R10 R34 R35 R36
1.00K	OHM 1/10	SMD 1%	411389	R8 R9
3.92K	OHM 1/10	SMD 1%	411446	R22 R21
4.32K	OHM 1/10	SMD 1%	411450	R45 R55
4.75K	OHM 1/10	SMD 1%	411454	R3 R7 R56 R57
10.0K	OHM 1/10	SMD 1%	411485	R19 R20 R23 R24 R25 R26 R27 R28 R29 R37
20.0K	OHM 1/10	SMD 1%	411514	R51
47.5K	OHM 1/10	SMD 1%	411550	R42 R41
100K	OHM 1/10	SMD 1%	411581	R15 R16 R17 R18 R30 R31 R32 R33 R38 R43 R46 R47 R48 R50
Relay	SPDT 24V MINI PC RELAY ITT#SZ24		450004	K1
Pot	10K TRIMPOT PIHER#PT110WH-10K		470058	R54 R44
Pot	50K TRIMPOT PIHER#PT10WH-50K470059			R49
Diode	1N5401 RECT 3A 100PIV		480005	D1 D2
IC	7805T POS 5V REGULATOR TO220 PKG		480083	IC1
Diode	1N5822 SHTKY 3A 40PIV		480100	D4 D5
IC	LM833N DUAL 8 PIN DIP		480175	IC4
Transistor	TIP35C NPN 100V 25A TO-218		480228	Q3 Q4
Diode	BAV70 DUAL DIODE COM CATH SMD		481019	D9
IC	833 DUAL OPAMP... SMD		481023	IC4
Transistor	2222A NPN 40V 600MA... SMD		481026	Q7 Q8 Q9 Q11
Transistor	2907A PNP 60V 600MA... SMD		481027	Q2 Q1
Diode	BAV99 DUAL DIODE... SMD		481033	D10
IC	74HC165 CMOS 8-BIT PAR S/R... SMD		481037	IC3
Transistor	5551 NPN 150V 200MA... SMD		481068	Q5 Q6 Q10 Q12
Sw	SPDT 2POS RT ANG PC MTG		510094	S6 S3
Sw	DPDT R/A SLIDE SWITCH		510121	S1 S2 S4 S5 S7
IC	PS-232 FIRMWARE ASSEMBLY		710567	IC2

# Component Layout Drawing





NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL RESISTORS ARE 1/10W 1% LISTED IN OHMS
2. RESISTORS 1/4W AND GREATER ARE 5% TOLERANCE
3. ALL CAPACITORS ARE LISTED IN MICROFARADS

REV	ECO#	DESCRIPTION	DATE	BY	CHK
A	2899	Release to Manufacturing	1-11-92	JKG	
DWN	JKG	DATE	3-13-01		
CHK		DATE			
APP		DATE			
ORCAD P/N	710568SA.DSN				
SHEET:	1	OF: 1			
SCALE					
DWG No.	710568 - SCH - C -	SIZE	C		
REV	A				

CLEAR-COM<sup>®</sup>

INTERCOM SYSTEMS

TITLE:  
Schematic  
PS-232 Power Supply

## CLEAR-COM LIMITED WARRANTY

Clear-Com products are warranted to be free from defects in materials and workmanship for a period of one year from the date of sale.

This warranty does not cover any defect, malfunction or failure caused beyond the control of Clear-Com, including unreasonable or negligent operation, abuse, accident, failure to follow instructions in the manual, defective or improper associated equipment, attempts at modification and repair not authorized by Clear-Com, and shipping damage. Products with their serial numbers removed or defaced are not covered by this warranty.

This warranty is the sole and exclusive express warranty given with respect to Clear-Com products. It is the responsibility of the user to determine before purchase that this product is suitable for the user's intended purpose.

Any and all implied warranties, including the implied warranty of merchantability are limited to the duration of this express limited warranty. Neither Clear-Com nor the dealer who sells Clear-Com products is liable for incidental or consequential damages of any kind.

For your own records fill in the information below:

* Model No.	_____	* Serial No.	_____
Date Purchased	_____		
Purchased from (dealer)	_____		
Address	_____		
City	_____	State	_____
		Zip	_____

### Factory Service

All equipment returned for repair must be accompanied by documentation stating your return address, telephone number and date of purchase, along with a description of the problem.

**Note: Do not return any equipment to the factory without first obtaining a Return Authorization Number.**

After obtaining a return authorization, send equipment to be repaired to:

**Customer Service Department  
Clear-Com Intercom Systems  
4065 Hollis Street  
Emeryville, California 94608-3505  
Telephone: (510) 496-6666  
Telefax: (510) 496-6601**

Warranty Repairs - If in warranty, no charge will be made for the repairs. Equipment being returned for warranty repair must be sent prepaid and will be returned prepaid.

Non-Warranty Repair - Equipment that is not under warranty must be sent prepaid to Clear-Com. If requested, an estimate of repair costs will be issued prior to service. Once your approval for repair, and repair of equipment is completed, the equipment will be shipped freight collect from the factory to the customer.



## TECHNICAL SPECIFICATIONS

### POWER SUPPLY

Type: Switching, with post filters and overload reset circuitry

Output Voltage: 30 volts DC

Output Current: Channel A, 1 amp continuous, 2 amps max

Channel B, 1 amp continuous, 2 amps max

Short Circuit Reset Time: 0.5 to 20 sec. depending upon recent overload activity

Hum & Noise: < -70 dBV

Station Capacity: 40 headset stations or 15 speaker stations, distributed over both channels

### PROGRAM AMPLIFIER

Type: Transformerless, Balanced Differential Input

Input impedance: > 100 k $\Omega$

Frequency Response: 150 Hz - 18 kHz  $\pm$  2 dB

Line Level Input: -20 dBV

### SYSTEM SPECIFICATIONS

Termination Impedance: 200  $\Omega$ , switchable

Intercom Line Length: 5,000 ft. maximum (single channel)

500 ft. for crosstalk < -50 dB (with multi-channel stations)

### REAR PANEL CONNECTORS

Intercom: (6) XLR-3M (3 per channel)

Program: (1) 1/4" TRS

AC Power: (1) IEC 320 connector

### REAR PANEL CONTROLS

(2) Termination on/off; (1) program input level

### FRONT PANEL CONNECTOR

Intercom: (1) XLR-3M (selectable channel A or B)

### FRONT PANEL CONTROLS & INDICATORS

(1) Intercom Select switch; (2) Program On-Off switches; (2) Program Send Level controls; (1) Test Tone switch; (1) A+B Link switch; (1) Power On switch; (2) "Overload" lights; (1) "A+B Link light; (1) Power "On" light

### POWER REQUIREMENTS

90 - 240 VAC, 50 - 60 Hz, 60 VA

### ENVIRONMENTAL

32 - 122° F (0 - 50° C)

### DIMENSIONS

19" W x 1.75" H x 5.25" D (483 mm x 44 mm x 133 mm)

### WEIGHT

4.5 lbs. (2.05 kg)

### NOTICE ABOUT SPECIFICATIONS

*While Clear-Com makes every attempt to maintain the accuracy of the information contained in its product manuals, that information is subject to change without notice. Performance specifications included in this manual are design-center specifications and are included for customer guidance and to facilitate system installation. Actual operating performance may vary.*

## GLOSSARY

Some of the terms used when discussing critical communications for television or theatre may be new to you as they are unique to intercom applications. Although many of the terms are common to other audio applications, to be certain you understand their meanings we offer the following definitions:

**All Call:** Ability to push one button from the main station and talk to all channels at once on a multiple channel system.

**Ambient Noise:** Those background sounds which are not part of the specific communication but are picked up by the microphone. Selection of a good "noise-cancelling" mic will reduce ambient noise.

**Beltpack:** A portable electronics package worn on the belt or mounted on a wall or other convenient location. Interconnects to system with mic cable and is powered by a central power supply or main station.

**Bridging, High Impedance (hi-Z):** A method of connecting to an audio line (such as Clear-Com) without loading or taking appreciable power from that line. Simply stated, as you add more and more stations to the line, the volume remains constant.

**Call Signaling:** This feature is included with the majority of Clear-Com products. It is a visual indicator on a station (lamp or LED) used to attract the attention of an operator who has removed the headset.

**Channel:** A channel is the line that connects parties together within a party line - it is a two-way talk path. For example, if you have six people who need to hear one director, you have a seven-station single-channel need. If the same director needs to speak privately to any one of the six, add a second channel. You now have a seven-station, two-channel system.

**Closed-Circuit:** Any intercom which is connected via cable (also called hard-wired). The other type would be Wireless. . .we make those too. However, if you want privacy and versatility, you probably want a closed-circuit system or a combination of both.

**Cross Talk:** Leakage of audio transmissions from one channel to another.

**Dry Pair:** A telephone term is used to describe a pair of wires (2 conductors) that carry audio but no DC voltage. Contrast this with a "Wet Pair" that carries both audio and voltage.

**Duplex:** Duplex refers to bidirectional communications. Normal communication between individual talking face to face is "full duplex" - in other words you can talk and listen simultaneously. The other alternative is "half-duplex" such as a push-to-talk situation where one station at a time can talk while others listen. A walkie-talkie is a good example of half-duplex communication.

**IFB:** The term means "Interrupted Fold Back." A Fold-Back is a monitor system that allows, for example, talent to hear their voices or musicians to hear their voices and instruments on stage. IFB (program interrupt) disconnects the program audio source while the talk button on the main station is pushed.

**ISO:** A private conversation path. An ISO channel allows one to simply push a button and transfer themselves and the person they wish to speak with to an isolated channel.

**Linking:** Linking ties separate channels into one single party line.

**Main Station:** This is a product that includes both the ability to communicate with multiple channels without connecting them together, and to power all the stations connected to these channels.

**Master Station:** A remote station which needs AC power to operate

**Multi-Channel:** More than one channel

**Party Line (P.L.):** Intercom system where all people talking on the system can talk or listen to each other simultaneously. Also called conferencing.

**Point to Point:** One path to one person.

**Program:** Audio source that is fed into the intercom channels.

**Program Interrupt:** Disconnects the audio source while the talk button on the main station is pushed. (IFB)

**Remote Mic Kill (RMK):** The ability for certain main stations to shut off all microphones on beltacks in a system.

**Remote Station:** Like the beltack, this would be any of the products connected to the intercom line that allow duplex or half-duplex conversation, but do not contain a power supply.

**Sidetone:** This is your own voice heard in your earphone as you are speaking.

**Stage Announce (SA):** Redirects output of the main station's microphone to an external destination (such as a PA system).

**Station:** A station is connected to one or more channels. For example, if you have six people who need to hear one director, you have a seven-station single-channel need. If the same director needs to speak privately to any one of the six, add a second channel. You now have a seven-station, two-channel system.

**Termination:** Passive network that is connected in each channel, usually on the power supply or main station.